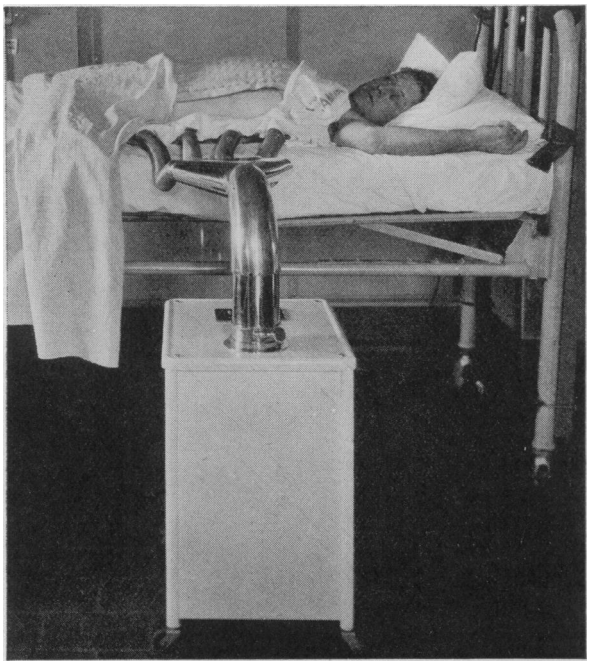

Fig. 3.—Assembly view of whole apparatus.

anticipate the possibility of shock. It is laid out in the patient's bed before he returns to it from surgery, and the bed is previously warmed thereby. As soon as the patient is in bed, it is used with the ordinary coverings and a moderate degree of heat kept up as long as necessary. It also subserves a very useful purpose in the treatment of individuals who are admitted into receiving and general hospitals in a state of shock from traffic and other accidents, as they can thus be warmed up in bed while an accurate diagnosis is being made.

1624 Franklin Street.

DISCUSSION

EDMUND BUTLER, M. D. (490 Post Street, San Francisco).—The Sweetland cast-drier gives promise of being an excellent method of administering controlled heat. First, used as a bed warmer it must be very efficient. Not alone are one or two local areas heated by hot-water bags, as is the usual procedure, but the entire covering and the mattress would be thoroughly warmed. This, I feel, is a distinct advantage. Secondly, used as a means of administering heat to the patient, this again is most advantageous; but I am of the opinion that it must be controlled very carefully, and not too great or prolonged a temperature produced. A very severe type of shock may be the result of continued high temperature.

I wish to thank Doctors Hitchcock and Reynolds for bringing this method of heat administration to our attention.

C. D. LEAKE, Ph.D. (University of California Medical School, San Francisco).—Evidence exists that "shock" is related to outpouring of adrenin and subsequent exhaustion of the adrenals (P. K. Knoefel, Calif. and West. Med., 39:344, 1933). This offers a probable explanation of the fall in temperature in "shock." Sparing the adrenals by supplying heat in this situation is thus rationalized, and certainly experience has abundantly justified the procedure. The method of providing heat described by Doctors Hitchcock and Reynolds is an ingenious, easily controllable, and highly effective one. Its use, as so succinctly indicated by them, should be very helpful, especially when available for emergencies.

BIOPSY IN MALIGNANT DISEASE*

By OTTO H. PFLUEGER, M.D.
AND
W. P. STOWE, M.D.
San Francisco

DISCUSSION *by Emile Holman, M. D., San Francisco; Orville N. Meland, M. D., Los Angeles; George S. Sharp, M. D., Pasadena.*

AS a result of intensive propaganda by the medical profession, patients with malignant disease are presenting themselves for care earlier than in past years. We are seeing, therefore, many more lumps of the breast, neck, subcutaneous tissue, etc., than we did, in which the diagnosis is neither obvious nor easy to make without direct examination of the entire tumor or a portion of it. Furthermore, even though one may make a correct clinical diagnosis, it is desirable to know the type of tumor with which one is dealing—its histologic picture, its probable response to irradiation, and its likelihood of recurrence. These things are important, and all available knowledge should be had concerning a tumor before treatment is undertaken. Pathologic examination is also necessary for the completion of our records, for only by such means can we evaluate any form of treatment three to five years later. This is especially true in those cases in which surgery is not contemplated and treatment is entirely by irradiation.

We feel, therefore, that a short discussion of the question of biopsy will not be amiss before this section of men who are largely responsible for the obtaining of tissue for examination. A knowledge of the indications and contraindications, and of the correct technique for obtaining a biopsy specimen, is of great practical importance in the treatment as well as in the diagnosis of malignant conditions.

We are not concerned in this paper with the procuring of a specimen from an ulcerated surface lesion. One can remove a small portion of tissue from the edge of such a lesion with a biopsy forceps with a reasonable assurance that no harm is being done. By means of an endotherm loop one has the possible added safety of control of hemorrhage and the questionable sealing of lymphatics. If this instrument is lacking, one need not, however, hesitate in taking a small piece from the edge in the ordinary manner, with as little trauma as possible.

DETERMINING THE NATURE OF THE TUMOR

What does concern us is how, with the least possible harm to the patient, we are to determine the nature of a tumor which arises beneath the surface of an unbroken skin. Properly performed, such biopsy will not decrease the patient's chance of cure, and will aid in outlining proper treatment. Three methods are available in cases of this type:

* From St. Luke's Hospital and the University of California Surgical Service of the San Francisco Hospital.
Read before the General Surgery Section of the California Medical Association at the sixty-fourth annual session, Yosemite National Park, May 13 to 16, 1935.

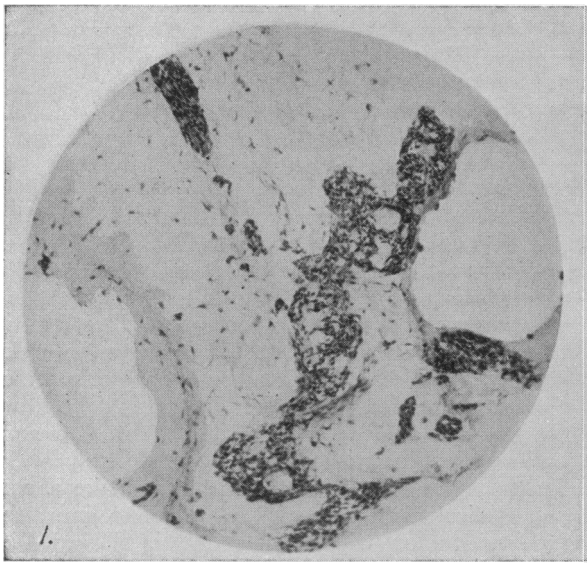

Fig. 1

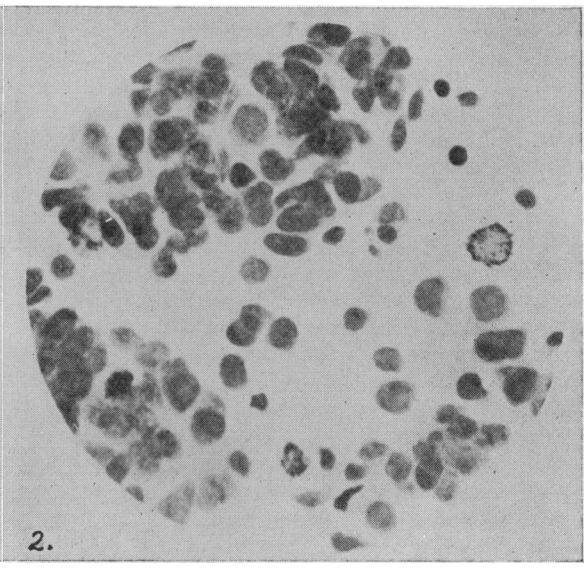

Fig. 2

Fig. 1.—Mixed tumor of parotid x 125. Loose myxoma tissue with nests of epithelial cells.
Fig. 2.—Carcinoma of parotid x 640. Irregularity of cell size and shape with three mitotic figures.

1. Incision directly into the tumor for observation of gross tissue, or removal of a portion for microscopic study.

2. Removal of the entire lump with a wide margin of normal tissue.

3. Aspiration of a small bit of tissue through an ordinary needle. With the last, one might mention such special instruments as the Hoffman punch,[1] but the mere simplicity of ordinary needle puncture and aspiration, requiring no unusual equipment, makes it the most readily available for this type of biopsy.

INCISION INTO THE TUMOR

Incision into a tumor, to observe its gross appearance or to procure a specimen, is undesirable and should be avoided when possible, because tumor cells may be implanted into normal tissue and a large number of blood and lymph channels are opened. Ewing especially feels that incision into a tumor alters the clinical setting by breaking down the natural local barriers, and favors early metastasis. The introduction of infection into a tumor, and the fungation of tumor tissue through the wound in the skin, are other possible complications. The latter is especially so in growths where the tumor tissue is under tension either because of the nature of the tumor—as in myxomas—or because of secondary necrosis. Bone tumors, also, are especially likely to fungate through a biopsy incision. Probably nothing which may occur in the course of a tumor's growth so alters

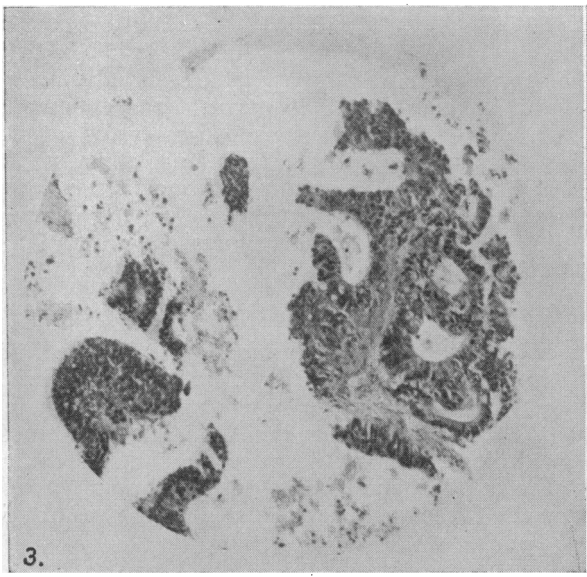

Fig. 3

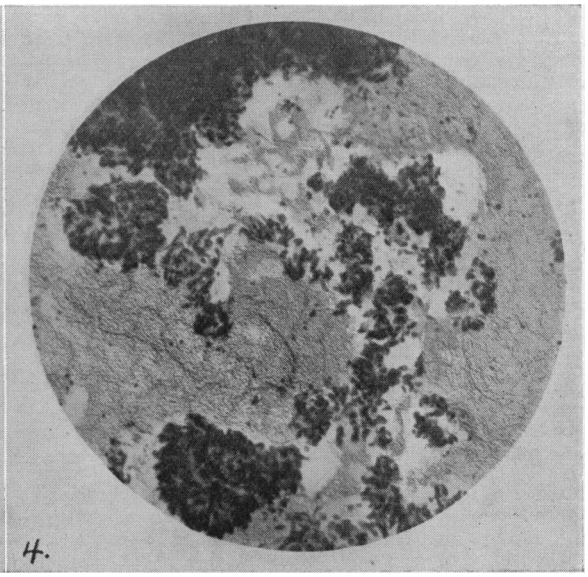

Fig. 4

Fig. 3.—Rib metastasis from adenocarcinoma of large bowel x 125. Paraffin section.
Fig. 4.—Same of stained crushed specimen.

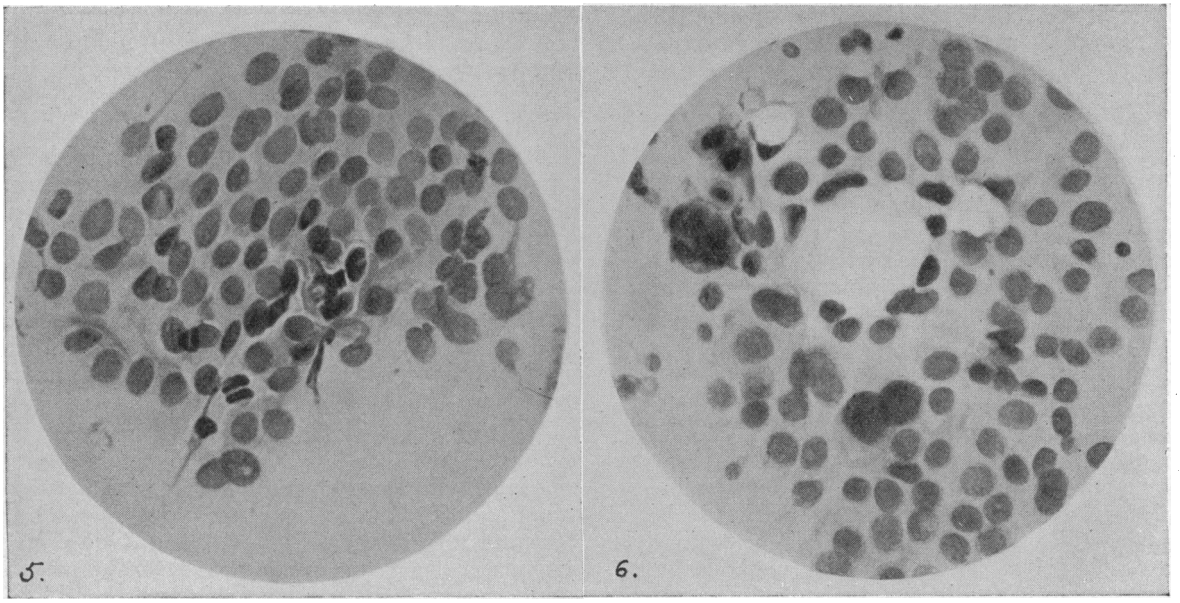

Fig. 5 Fig. 6

Fig. 5.—Intracanalicular fibro-adenoma of breast x 640. Uniformity of cell pattern.
Fig. 6.—Adenocarcinoma of breast x 640. Shows irregular cell and nuclear size and pattern. One cell with four large hyperchromatic nuclei; one with two.

its clinical picture, and behavior and response to treatment, as does infection. Scrupulous care is needed to avoid it.

There are, however, instances when incision into the tumor for diagnosis is necessary. When this is so, a definite routine should be planned beforehand. Facilities for immediate diagnosis should be available, and the treatment indicated carried out at once. While we are not concerned here with treatment, the procedure of biopsy cannot be divorced from it. For instance, many surgeons transect a tumor of the breast to observe the cut surface for diagnosis. If carcinoma, the radical operation should be performed at once, after cauterization of the wound, and change of drapes, gloves, and instruments. It is a safer procedure to excise the lump widely, not cutting into it until it has been entirely removed. In biopsies of bone tumors everything should be ready for radical operation immediately if indicated. If a frozen section diagnosis at the operating table is not possible, the wound should be carefully closed, and x-ray treatment given in the interval it takes to arrive at a definite diagnosis. The Bone Sarcoma Registry contains cases well after five years in which some days elapsed after biopsy before radical treatment was instituted.

For perfectly obvious reasons biopsy is always indicated for confirmation of clinical diagnosis before such a radical procedure as amputation is undertaken. Such biopsy should be preceded by irradiation. X-ray treatment should also precede biopsy on soft tissue tumors to reduce the likelihood of metastasis, and to observe the effect of irradiation. In large lymph-node tumors, such as Hodgkin's disease or lymphosarcoma, it is preferable to take for biopsy a free node at the side of the bulky tumor, even though this gland may not always show a complete picture of the process. Where interstitial irradiation—that is, conservative treatment of metastatic glands—is the practice, the nodes may be exposed, a biopsy taken, and radon seeds or element needles immediately inserted into the gland which makes a good holder for the needles. Indiscriminate cutting into any lump which one may find is poor surgery, and poor cancer treatment, and should be condemned.

EXCISION OF TUMOR

Wide excision of a tumor for histologic examination is the procedure of choice whenever possible. This may not be feasible nor possible in large tumors. We prefer local excision of a small lump in the breast to incision into it. The Cancer Commission of the California Medical Association,[2] in its report on breast tumors, recommends local removal of a doubtful tumor, unless cancer is obvious at the first approach. To be sure, rough handling of the tumor and surrounding tissues may make for the situation we are trying to avoid, namely, the spreading of the disease, but all of us are aware of the delicacy that must be employed in the surgery of any neoplastic tissue. This procedure is of advantage also in that it yields the whole tumor for examination. Another reason for preference of local excision is that if the tumor proves to be benign, the operation has been completed and one need only close the wound.

There is another field where wide local excision is not only feasible but urged upon you, and that is in the case of the small subcutaneous tumor. The serious nature of these tumors is frequently overlooked. Many are sarcomata, and it is possible only by examination of the tissue under the microscope to distinguish between the benign

fibroma or neurofibroma and the small sarcoma. These small sarcomata are peculiarly prone to recur. To incise one for diagnosis is, therefore, foolhardy, and equally so is its simple enucleation. Wide removal constitutes adequate surgery, gives one the entire tumor for examination, and is a safer procedure. To quote from another report of the Cancer Commission:[3] "Biopsy for small lumps is condemned. Excision is safer, certain, and not more difficult, and lends itself to a more thorough study of the whole tumor microscopically."

ASPIRATION BIOPSY

We prefer aspiration of a tumor to incision into it, for the purpose of obtaining material for histologic examination. There is definite indication for it in those tumors beneath the skin where complete removal of the lump is not feasible for adequate reasons, and where, ordinarily, incisional biopsy is done. It should also be used in those cases where irradiation is the best method of treatment in order to give us a histologic record for evaluation of the treatment, at the same time avoiding a surgical procedure in the operating room in obtaining this tissue. Furthermore, irradiation has less effect upon a tumor which has been incised and where fibrosis is present. Aspiration avoids the necessity for incision, and its disadvantages.

The method is not new, but for some reason it has not been utilized to the fullest extent of its possibilities. Within recent years it has been used largely at Memorial Hospital in New York; and papers by Martin and Ellis,[4,5] Coley and Sharp,[6] Sharp,[7] and by Ferguson,[8] have shown its value in various clinical varieties of growths. Tumors of cervical nodes, metastatic and primary; parotid and submaxillary glands; intra-oral tumors with nonulcerated mucous membrane; breast, bone, thyroid, lung, prostate, and soft tissue, have been diagnosed by this method. Recently, Stewart,[9] at the same institution, has reported on the pathologic interpretation of the material so obtained in 2,500 cases. No untoward results were noted in any of the cases as a result of the procedure.

The method used to obtain the tissue is that recently fully described by Martin and Ellis[4] in their paper published in 1934. It consists briefly in advancing an 18-gauge needle, attached to a tightly fitting record syringe, into the tumor through a stab wound in the skin made after injection of a little novocain. After the needle has entered the tumor, negative pressure is made within the syringe, and this is maintained continuously until one is ready to withdraw the needle. The needle is advanced in the tumor, withdrawn the same distance, again advanced at a slightly different angle, withdrawn an equal distance; the vacuum in the syringe is slowly reduced; the syringe detached and the needle separately withdrawn. The material in the needle is ejected onto a slide, crushed between two slides, air-dried, slightly flame-fixed, and then flooded with absolute alcohol for about two minutes to fix more firmly to the slide. Then it is washed in water; stained with hematoxylin (our preference is five to ten minutes in Mayer's hemalum); washed; mordanted in tap water for five minutes and stepped up through eosin in 95 per cent alcohol; two changes of absolute alcohol; carbolyxlol; hylol; and mounted with Canada balsam.

Resultant cell groups are searched for with low power, and analyzed with high power for arrangement—often typical—hyperchromatism, atypical structure or architecture; cell irregularity in size or nuclear pattern, and mitotic or amitotic division figures. There must be kept in mind that the aspiration picture will overemphasize the softer and more cellular structures, the fibrotic, hard, resistant tissues being less included in the needle specimen.

At times, no tumor cells are present in the smear. This occurs if the technique is faulty; at times, with correct technique, if the tumor is hard and fibrous; or when the mass is cystic or inflammatory rather than neoplastic. One elderly woman had a large cystic tumor of the maxilla with pressure bone erosion, which was considered as a possible adamantinoma. The material aspirated showed no tumor cells, only pus and inflammatory cells. At operation a large, smooth, thick-walled cyst was easily removed, which on section was entirely inflammatory. Tuberculosis of cervical glands was diagnosed in another case, and in another a liver mass was found to be actinomycosis.

That aspiration biopsy has certain drawbacks, no one can deny. These lie chiefly in the finer pathologic interpretations. The various types of cancer of a particular organ usually cannot be differentiated, nor can one always grade a tumor and so determine its probable response to irradiation. Coarser differentiations, however, are possible. For instance, in material aspirated from cervical nodes one may see squamous pearls, or one may find the sheets of cells characteristic of the transitional cell type, and so know what type of treatment is indicated. We have so done in our own series, with the transitional type completely disappearing under x-ray treatment. What one is diagnosing is usually a smear of tissue, unless one obtains enough material for paraffin section. Cell relations are largely lost, as are the relations of the whole tumor to the surrounding tissue. But neither do we have this latter information when a small piece of tissue is removed through an incision, and that is what most surgical biopsies consist of.

It must be emphasized that the method is not one for academic detachment. The pathologist and the clinical surgeon must sit down together with their completed slides and consider all aspects of region and tissue involved, and the clinical aspects of the case. Then, out of their combined efforts they must try to formulate a diagnosis. Many times the resultant will be definite as to type and malignancy; many times definite as to malignancy, but not type, and many times it will be, in honesty, "indeterminate." In these cases no chagrin need be felt, as the patient has not been harmed and the traditional methods can then be employed.

The essential training in learning this method is to needle every routine tumor received in the laboratory and then compare these preparations with the tissue sections until some wisdom is attained in their interpretation.

Mention of a few locations in which aspiration is feasible and has helped us is probably the best way of demonstrating its value. It can be used in doubtful tumors of the breast. It is especially valuable in those cases which turn out to be cancer, because then the indicated treatment can be carried out with the least previous interference. If benign, the patient can be reassured with little loss of time. Also cases may be quite obviously cancer, but for some constitutional or other reason treatment must be entirely by irradiation. It is important to have histologic proof for record, which can be obtained very easily by aspiration. Bone tumors, especially liable to fungate through biopsy wounds, can be diagnosed as to their general nature by aspiration when the cortex is sufficiently eroded to allow penetration of the needle. The same applies to antrum tumors. Coley and Sharp[6] have reported success in aspiration of bone tumors in a high percentage of cases, occasionally having a diagnosis only of malignant tumor cells, but most often a definite diagnosis as to type.

The differential diagnosis of cervical tumors is frequently difficult, and especially so if no primary lesion is found to account for metastasis. The first indication of a large percentage of pharyngeal or tonsillar lesions is an enlargement of cervical glands. Aspiration will most often make the diagnosis of the condition in the nodes; at least it will give strong presumptive evidence as to the nature of the condition. Presumptive evidence is usually all that is possible in Hodgkin's disease and lymphosarcoma. We have repeatedly made correct diagnoses in cases of metastatic glands, and have at times ruled it out by finding an inflammatory condition. If necrotic material is obtained, it may be due to an inflammatory condition, such as tuberculosis, or to broken-down carcinoma. The latter occurs frequently if irradiation has been previously given, but one can usually find cells which are undoubtedly of a malignant nature. Aspiration is attended with much less interference than the removal of such a gland.

It is impossible to consider all types of tumors and locations in which aspiration is of value. As mentioned, it can be used in cases where an incision into the tumor would ordinarily be made. Reference to the figures will show some of the material we have obtained by aspiration, and the microscopic picture of the same.

CONCLUSIONS

1. To know the indications for biopsy is a need of every individual who treats neoplastic diseases.

2. Surgical incision into a tumor should be avoided, and can be avoided in most instances.

3. Wide excision of a tumor for diagnosis is the best means of obtaining tissue for examination whenever feasible.

4. Aspiration through needle puncture is a sensible means of biopsy, and will give a tissue diagnosis in most instances.

384 Post Street.

REFERENCES

1. Hoffman, W. J.: Punch Biopsy in Tumor Diagnosis, Surg. Gyn. Obst., 56:829, 1933.

2. Cancer Commission of California Medical Association: Report of Breast Tumors Committee, Calif. and West. Med., 37:208, 1932.

3. Cancer Commission of California Medical Association: Report of Committee on Connective Tissue Tumors, Calif. and West. Med., 40:309, 1934.

4. Martin, H. E., and Ellis, E. B.: Aspiration Biopsy, Surg. Gyn. Obst., 59:578, 1934.

5. Martin, H. E., and Ellis, E. B.: Biopsy by Needle Puncture and Aspiration, Ann. Surg., 92:169, 1930.

6. Coley, B. L., Sharp, G. S., and Ellis, E. B.: Diagnosis of Bone Tumors by Aspiration, Am. J. Surg., 13:215, 1931.

7. Sharp, G. S.: The Diagnosis of Primary Carcinoma of the Lung by Aspiration, Am. J. Cancer, 15:863, 1931.

8. Ferguson, R. S.: Prostatic Neoplasms—Their Diagnosis by Needle Puncture and Aspiration, Am. J. Surg., 9:507, 1930.

9. Stewart, F. W.: The Diagnosis of Tumors by Aspiration, Am. J. Path., 9:801, 1933.

DISCUSSION

EMILE HOLMAN, M. D. (Stanford University Medical School, San Francisco).—There can be no question that biopsy upon suspected malignant disease is more frequently necessary at the present time than in former days, when patients consulted a physician for cancerous lesions recognizable as such on inspection alone. In performing such biopsies it is most necessary to bear in mind the potential dangers inherent in the procedure. The division or rupture of blood and lymphatic vessels within a malignant tumor inevitably conditions the possibility of cancer cells being carried off into the blood or lymphatic systems to be deposited elsewhere beyond the surgeon's reach.

In the course of a recent operation for a questionably malignant tumor of the breast, the mass was transected and observed to be cancer; then the cut surfaces were cauterized with phenol and the incision closed. An immediate radical mastectomy was performed. Microscopic examination of the axillary nodes revealed whole fresh blood cells in the lymph sinuses within the glands. These undoubtedly had their origin from the cut surfaces of the first incision. The interval between the incision and the removal of the nodes was approximately sixty minutes. There is no reason why cancer cells could not be equally quickly transported from tumor to lymph sinus. The lesson is obvious. No biopsy should be undertaken that is not followed immediately by the proper treatment, whether it be surgery or radiation therapy.

Aspiration biopsy requires special training in the interpretation of the material obtained, and should not be undertaken unless such experience in interpretation has previously been available. Given the essential equipment and a properly trained pathologist, the aspiration biopsy should have a wider field of usefulness.

Transection of the tumor for inspection of the cut surface should be reserved only for lesions that are not easily enucleable. Where possible, complete excision of the tumor, as in small lesions of the breast, is the most desirable method of obtaining a specimen, the character of which will determine the subsequent course of the operation or treatment.

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ORVILLE N. MELAND, M. D. (1407 South Hope Street, Los Angeles).—Despite all our efforts in the refinements of diagnosis of tumors, we are still dependent upon biopsy.

In the final analysis, it is only by microscopic examination of the suspected tissue itself that one is able to make a definite diagnosis of a benign or a malignant condition. From a theoretical standpoint, there is always a possibility of dissemination when a biopsy is done, but the possible harm is much less than the good it accomplishes for the patient. However, when done, suitable treatment should be carried out immediately so as to lessen such a danger; this is especially true where the surgeon must cut through normal tissue to reach the suspected lesion.

Within the last few years the use of aspiration biopsy has come to the front. It is particularly useful where the treatment is to be radiological, rather than surgical; but even where surgery is contemplated after preoperative radiation, it is advisable, as it not only makes a definite diagnosis possible, but it acts as a guide in establishing some criterion as to the amount of therapy that should be given.

These are the advantages, but there are certain disadvantages also. When positive the method is excellent, but where the aspiration is negative it means little one way or the other. For instance, in suspected Hodgkin's and lymphosarcoma it is to be condemned, for even when an entire node is removed the pathologist may have difficulty in arriving at a correct conclusion; so, wherever feasible, the regulation method of biopsy is preferable.

It is very commendable of Doctor Pflueger to focus our attention on biopsy again. Whatever progress we hope to make in the early recognition of cancer must necessarily be along these lines. The method of doing a biopsy is of secondary interest; it is the interpretation of the tissue that is of paramount importance.

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GEORGE S. SHARP, M. D. (605 Professional Building, Pasadena).—We have heard a complete treatise on the subject of biopsy, and only certain statements that Doctors Pflueger and Stowe have made need emphasis.

The preliminary working diagnosis should be based primarily on a thorough history and complete physical examination. Special examinations, such as transillumination, are important diagnostic procedures, and should always be performed when of advantage for the most accurate clinical impression. Information gained from the above examinations should enable the physician to determine the correct diagnosis in at least 85 per cent of the patients.

Pathological confirmation of the diagnosis is desirable many times before treatment is started, when the clinical findings are not definite. Frequently a radiation program is planned, or preoperative x-ray therapy is advisable, and a pathologic report is most necessary for the tissue structure and degree of anaplasia. The proper dosages of radiation must be based on this microscopic study.

The aspiration biopsy is of great value for the above material in certain cases. By this procedure, a tissue examination is possible without risk (Ewing, Stewart) and without loss of time and wound healing, and it is a procedure that may be performed without hospitalization or delay. The aspiration biopsy may be used for many ulcerated tumors. This procedure is used regularly for locating and identifying intracranial tumors. I have found the procedure of very definite value in identifying metastatic lymph nodes, tumors in the upper lobe of the lungs, or those located well out in the parenchyma, beyond the reach of the bronchoscope. Complete differentiation cannot always be made upon the smear, but the question of malignancy can be settled. This type of tissue study does not make it possible to differentiate between the different members of the lymphoblastoma group and Hodgkin's disease.

The reason for this discussion, I believe, is to condemn the hasty operation for diagnosis, and to replace it with a more complete and effective program which is based on the complete clinical findings (with a possible aspiration diagnosis) in order that no step in the attack against a malignant growth is omitted.

THE LURE OF MEDICAL HISTORY†

QUACKERY AND NATUROPATHIC LOGIC IN 1795–1825

By HAROLD M. F. BEHNEMAN, M.D.
San Francisco

REMEMBERING that, in the year 1934, the electorate of California were called upon to vote on the Naturopathic initiative (No. 9), it is interesting to review the same unscientific concepts and biased logic which existed one hundred and fifty years ago.

CULTIST SAMUEL THOMSON'S BOOK: THE "NEW GUIDE TO HEALTH; OR, BOTANIC FAMILY PHYSICIAN"

On February 9, 1769, one Samuel Thomson was born, to later become an outstanding cultist in the State of Massachusetts. In the fifty-third year of his life, and in the forty-seventh year of American Independence, he persuaded one Horton Howard of Columbus to publish a volume of one hundred and twenty pages entitled, "New Guide to Health; or, Botanic Family Physician."

By 1827, this book had run through four editions. Like the majority of modern cultist publications, it divided its contents into two main parts—first, the experience and theories of its author, and, secondly, the usual attack upon the medical profession. We learn that the tendency of lay practitioners today to sell, patent or copyright their wares, is at least a century and a half old.

On page 1 of his book, Mr. Thomson reveals his true colors as a cultist in the following utterance, so characteristic of an unscientific mind, devoid of knowledge concerning the fundamental elements of Hippocratic medicine, stating his "Agreement," frequently italicized by himself: "The subscriber, who is the discoverer and proprietor of the system of medical practice contained in this work, agrees to give, whenever applied to, any information, that shall be necessary to give a complete understanding of the obtaining, preparing and using all such vegetables as are made use of in said system, *to all those who purchase the right;* and the purchasers, in consideration of the above information and also what is contained in this book, agree, *in the spirit of mutual interest and honor, not to reveal any part of said information, to any person except those who purchase the right,* to the injury of the proprietor, under the penalty of forfeiting their word and honor, *and all right to use of the medicine.* And every person who purchases the right, is to be considered a member of the Friendly Botanic Society, and entitled to free intercourse with the member for information and friendly assistance."

† A Twenty-five Years Ago column, made up of excerpts from the official journal of the California Medical Association of twenty-five years ago, is printed in each issue of CALIFORNIA AND WESTERN MEDICINE. The column is one of the regular features of the Miscellany department, and its page number will be found on the front cover.